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AUTHOR von Raffler-Engel, Walburga
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ABSTRACT

Developmental kinesics is the acquisition of nonverbal conversational behavior by the child. Semiotics is the study of what behavior means. Together they express the relationship of content and expression. Physiologically, verbal language and paralinguistics represent the vocal-auditory mode, while kinesics represents the gestural-visual mode. Content is expressed verbally, paralinguistically, and nonverbally. Vocal and kinesic behavior develop jointly to express the first communicative function, which is affect. The acquisition of the emotive function of communicative behavior is vital for two reasons: (1) it is the first function to be acquired by the child while still in the interuterine stage; and (2) it is the most important communicative function in the organization of human society and the preservation of culture. The question arises as to whether a communicative system composed of gesticulation and paralinguistics is operant before the advent of verbal language and kinesics. In fact, the interaction is verbal and nonverbal from the start. Prenatal interaction between mother and child facilitates neonatal adjustment to the outside world, enculturates the child into society, and prepares the child for the acquisition of adult language. (HOD)

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Walburga von Raffler-Engel

Program in Linguistics, Vanderbilt University

THE ONTOGENY OF COMMUNICATION

My main concern is nonverbal behavior and like my good friend, Adam Kendon, I appreciate the openness of most semioticians to our field of interest. We work on an experimental and observational basis and we induce signification from overt data but have no strong theory from which we make deductions. Our prime concern is factual and we welcome suggestions from semioticians of all schools, and anybody else for that matter. I myself was a student of Hjelmlev from whom I learned much without becoming a follower of glossematics. And I also was a student of Jakobson's but am not a fully convinced structuralist either. (von Raffler-Engel 1964:107). There is always the danger that the facts are stretched to match a rigid theoretical framework. In looking at the relationship between function and culture, to give an example from architecture, structuralists see an opposition while I see a symbiotic relationship. Houses are built to suit the cultural habits of their prospective inhabitants. Builders also introduce changes that eventually alter the cultural habits whatever the origin of those particular cultural phenomena. Large Greek temples had boustrophedonic inscriptions, small

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tombstones could be read from left to right. Content and expression can not be easily separated.

A large part of what I will talk about today concerns Developmental Kinesics, the acquisition of nonverbal conversational behavior by the child. If anybody is particularly interested in that field, I recommend my survey article in the current May 1981 issue of the Child Mental Health Journal and a book entirely devoted to Developmental Kinesics, The Emerging Paradigm ed. by B. L. Hoffer and R. N. St. Clair, University Park Press, 1981.

Semiotics, broadly defined, is the study of signification; what behavior means. We are looking into the relationship of content and expression. My own background is in sociolinguistics and psycholinguistics and I am an empirical researcher. Partly as a result of my findings and of my personal inclination, I am opposed to Platonic realism. I am convinced that co-occurrence obtains between content and expression and that the relationship is a necessary condition for either to exist.

What I question is the feasibility of studying content as an isolated level. Diachrony shows that there is a constant interplay between content and expression. The classic example is the force of paradigmatic pressure in blocking the automatic loss of the sound w between s and o (which had occurred in words like sword) in the verb swore, past tense of swear. The mental association of the present and the past tenses of the same word guaranteed the preservation of the sound. Analogy which is the main force in linguistic change (Anttila 1972) operates on both levels in the most intricate manner.

An analysis of linguistic content independent of expression can not even be achieved by arbitrarily defining expression as audible by its very nature. One can interpret one's dreams in one's thoughts without ever speaking. A multilingual person can think in many languages but the choice of a language is a choice of means of expression. Systems of objective logical semantic relationships, although form-independent in their final formulation, have been derived through generalization from expressed realities which were experienced by their proponents. To my opinion, theories of pure content are nominalistic devices for analytical procedures and legitimate only as such.

One fundamental question comes to mind to which I have not found a satisfactory answer: What ultimately is the difference between content and expression? Content is derived from electro-chemical reactions in the brain and expression is derived from motor activities of the vocal cords and the joints of the body. In telepathy a message is transmitted without the intermediacy of audible-visible means of expression. The message is nevertheless considered content, and so are somebody's thoughts about the good old times. It seems that our criterion for the quality of content, contentness, is its potential for manifestation in expression. The reason for expressibility to qualify something as content lies in the fact that through expression it becomes interpretable by other. Content presupposes interaction. A good example comes from child language.

Children - and adults, for that matter - emit sounds without directed eye gaze or other forms of communicative nonverbal behavior. When children produce speech sounds without communicative intent, these are rarely interpreted by their caretakers. But "when children produce speech sounds in

the context of a communicative act (intention to communicate being signalled by non-verbal cues), then adults work hard to put an interpretation on the child's utterance" (Foster 1980:7).

➤ Meaningless behavior acquires meaning, that is content, when it acquires interactional value. The little son of a student of mine had a babbling sound which had no recognizable meaning to begin with. Eventually, the infant's father took a liking to that sound ("gigl"), and the child realized that his father would come to his crib whenever he uttered that particular babble. It was its adult interpretation which gave a meaning that was understood by the infant who subsequently produced it with that meaning, in order to call his father. (von Raffler-Engel 1970). It was not content that was manifested in expression but expression that acquired content. Children soon learn from experience that if they get close to an electric outlet or touch a delicate object that might break, their mother will approach them. An accidental behavior becomes voluntary as an attention getting device. Behavior without original meaning is now purposely and consistently produced in a fixed context. It has acquired signification.

To stomp one's feet in anger is a "discovered action", to use the term coined by Desmond Morris (1977:17). Such actions gain meaning through interaction. The typical facial expression of anger is universally recognizable (Izard 1971) but its signification is culture-specific. Servants realize that they cannot show anger at their masters, loved ones realize that showing mild anger towards those who love them may be most profitable. Signification is not a simple but a complex phenomenon. The demarcation between connotation and denotation cannot be found with certainty even under optimal conditions. In most instances it is not the

same for the speaker and the hearer. As Vilmoš Voigt (1981) aptly put it last week in this session, "The sign is always simpler than the phenomenon it represents."

The sign is simpler than the reality because that is its function, to reduce reality to manageable proportions. Structure is not in the thing but in the mind (von Raffler-Engel 1978). We have the inborn capacity to organize and categorize events so that we can understand them. Structure is a conceptual scheme. Our conceptualization varies widely depending on culture. The differences in life experience and in personality are such that even between two persons of the same culture, intended meaning does not equal perceived meaning. The potential signification of intended meaning is actualized through a series of transformations into perceived meaning which is real signification.

In semiotic theory, most talk is about the deep structures underlying the conceptualization of the speaker. I personally feel quite uncomfortable with this. From the many existing theories (and I certainly would not claim to know them all), I choose eclectically and really only from two, Peirce and Eco. I do not fully agree with any semiotician and only mildly favor Peirce because the Peircian division into iconic, indexical, and symbolic is implicitly based on the reaction of the perceiver. Something is iconic because the receiver establishes a relationship of the new item with a previously known item. Symbolicity is lost through changes in culture which obfuscate certain relations, not to mention individual perception of what is symbolic and what is iconic. The focus of symbolism may also change over time. Certain forms of table manners, for example, may have had ritualistic connotation which we simply can no longer reconstruct. At present they serve for in-group identification.

As a linguist, I shall restrict this brief study of signification to language, language being defined as human communication. Communicative expression can be divided into three components: verbal language, paralinguistics, and kinesics. Written communication is fundamentally different from spoken communication because the verbal component has to be expanded in order to supply information which in the normal face-to-face interaction is conveyed by paralinguistics and kinesics. Grammatical theories that analyze transcripts of spoken language as if these transcripts represented an original written production are inadequate. They attribute underlying structures to the verbal component that do not belong to it but were overtly present in the other two components. Such theories make verbal language too powerful.

Physiologically, we have verbal language and paralinguistics on the one side, representing the vocal-auditory mode; and kinesis on the other representing the gestural-visual mode. Brain researchers classify verbal language as pertaining to the left side of the brain, and group paralinguistics and kinesics together as pertaining to the right hemisphere (Kimura 1973). I prefer to work within the physiological division for two reasons. One is that our knowledge of lateralization is scanty at best. The other is that the boundaries between verbal language and paralinguistics are not always easily identified while the auditory and the visual channels are clearly distinct.

In a speech act the signification results from the combination of the three components. Combination does not only mean the addition of the three components, it also implies their relations. We could say that the content is expressed verbally, paralinguistically, and nonverbally. We cannot say that content is divided into three parts that are expressed differently, one part through verbal language, one through paralinguistics,

and one through kinesics. In the natural condition, the expression of any bit of content needs the three components for its manifestation. Some people assumed that emotions are carried by paralanguage and kinesics while the referential message is expressed verbally. Emotions can, however, be phrased in loaded verbal language within the rules of grammar. In addition, one must distinguish between the emotional ego state of the speaker and the emotion that is part of the message to be conveyed, independent of his personal involvement or not. Culture dictates a quiet voice, fairly monotonous intonation, and a slightly lowered head to express condolences, to give just one example of possible ambiguity of real or fake emotion.

I'd like to go beyond the classification proposed by Ekman and Friesen (1972). Ekman draws "a distinction between individual and interpersonal concerns" (ibid: 354) and defines nonverbal behavior as "communicative or interactive" (ibid: 357). By "communicative" Ekman means behavior that communicates about the individual as such while "interactive" behavior concerns his interpersonal relationship. I prefer to call "communicative" behavior "ego state" but this is only a matter of terminology. Ekman's "interactive" behavior I would divide into two separate types. Interactive behavior of the regulatory type regulates the interaction qua interaction; it governs the flow of conversation. Interactive behavior of the referential type concerns the message conveyed during the interaction, like making a spiraling movement with one's hand to illustrate a winding staircase. The referential and the regulatory categories serve as basic division of work.

In making the distinction one should keep in mind that natural human behavior is always "messy" and no category is impervious to overlapping.

Increased gesticulation to keep one's conversation partner from taking the speaking turn or from gazing around vacuously and losing attention may also increase the perceived importance of the actual message. It was said above that the three components combine to provide meaning. Even within each component, a multiplicity of factors is operant. In nonverbal behavior it is the gesture cluster which is interpreted by the viewer, not the isolated single gestures. Applauding with a sarcastic grin on one's face is not the same as applauding with a cheer. (von Raffler-Engel 1977). The effect is cumulative and not simply additive. The ironic grin accompanied by applauding hands has a far more devastating effect than that same facial expression combined with a still, erect torso with hands folded on the lap. Derision is more offensive than criticism. Through the study of language development with its possible inferences on phylogeny, I have become convinced that vocal and non-vocal components are part of human communication from its inception. It also became apparent that expression may acquire content without alteration in shape, or through the addition of other features.

A survey of the field of glossogenetics (de Grolier 1979) shows that it represents largely an area of profound disagreement among the scholars that have dealt with some of its aspects. It also shows that many of its aspects are still unexplored. This paper will skirt the global issues of glossogenetics in an attempt to contribute to one small aspect of the field, the importance of the fact that vocal and kinesic behavior develop jointly to express the first communicative function which is affect. (von Raffler-Engel, i.p.)

The acquisition of the emotive function of communicative behavior is vital for two reasons. It is the first function to be acquired by the child

while still in the inter-uterine stage. It also is the most important communicative function in the organization of human society and in the preservation of culture. The fact that this paper will describe the development of a communicative function in the child should not be considered indicative of automatic agreement with the belief that ontogeny recapitulates phylogeny. It goes only so far as to assert that if a phenomenon develops very early and is universal, its origin is likely to go very far back in time. While the first reason is suggestive of a phylogenetic parallel to ontogeny, the second reason points very strongly towards phylogenesis. If a communicative phenomenon is crucial to the existence of homo sapiens qua homo sapiens, it can safely be considered an integral part of communication qua communication; thus must have existed from its inception. Given its presence in the pre-natal stage, it is unlikely that the phenomenon has undergone radical evolutionary changes. The latter, nevertheless, can not be asserted with absolute certainty because even though the general physical maturation of the human embryo does not substantially differ from that of other mammals, the formation of the brain in humans show divergence. At the present time, any theory about the origin of language can only be tentative.

Where this paper will take a stand is on the controversy whether the use of gesture preceded language, as first suggested by Wundt, or whether gesture originated synchronously with language. Nobody seems to suggest that the development of gesture is subsequent to language. My findings indicate that it is possible to speak of gesture and to speak of sound, but one cannot speak of a primary natural communicative system that does not encompass both. The child's acquisition of that system can only be pluri-modal. A means for face-to-face interaction that has only one of

the two modalities is not a natural communication system. The sign language of the deaf is a complete system, but it is not the normal person's first choice. Animal communication, too, is organized on both channels. The animal mother controls her offspring by gestural and vocal means immediately after delivery, like human mothers do.

The real question is not whether the expressive behavior of the visible-gestural mode preceded that of the audible-vocal mode. It is whether a communicative system composed of gesticulation and paralanguage is operant before the advent of verbal language and kinesics. If pre-verbal communicative man evolved into verbal man, we are confronted with the problem of why, when, where, and how man gained verbal language. In the ontological development, the process can be identified. A step by step description of the gradual emergence of language from paralanguage was presented during the International Symposium on Intonology at Charles University in Prague, 1970 (von Raffler-Engel 1972). This research was based on one case study and on field observations of four other children (von Raffler-Engel 1964:79, 91).

What happens is that sometime between the end of the fourth and the middle of the sixth month, children concentrate on one particular sound of the various sounds they are able to produce and so far have uttered at random. That sound is used consistently for regulatory purposes. Its meaning is something like "I want your company". In a very short period that sound acquires two distinct prosodic variations. The child points to an object and utters the carrier sound with rising intonation when he wants that object to be handed to him. He uses the pointing finger and utters the carrier sound with falling intonation when he simply wants to notify of the presence of a new or misplaced object. The intonation and the gesticulation add the referential dimension.

During the eighth month, children progress from meaning expressed melodically to sound as a unit capable of expressing meaning. Grégoire (1937-1947: vol. II, 125) called such sounds "signes précurseurs". In my case study the subject used three distinct vowels; one vowel was used for the previously established signification of notification that there was a change in object arrangement including the appearance of a new object. A second vowel was used for the other signification, the desire to have an object, which had also been previously signified by melodic variation. A third vowel carried a novel meaning, disapproval or complaint about his mother's lack of attention to himself when he wanted her companionship. (von Raffler-Engel 1964: 100). There was an extensive period of overlapping of these meaningful sound variations with the meaningful prosody on the one side and the subsequent emergence of holophrasis on the other.

The development from the melodic carrier sound to meaningful vowel variation constitutes an important step towards the formation of verbal language. Referential meaning is no longer expressed only paralinguistically but also via segmental sounds. The unanswered question is whether the availability of purposely differentiated sound production triggered the desire to attribute different meanings to each of these sounds, or whether the cognitive urge to have a wider range of significations caused the physiological capacity to purposely utter a series of distinct sounds. If one considers synchronous maturation one has the perfect sign and it becomes ever more difficult to pursue an analysis of content independent of the analysis of expression. This problem refers equally to when the child starts adult language. That he understands many words earlier than he can pronounce them implies that recognition precedes production in

reference to expression. It does not prove--or disprove for that matter--that the child develops content before he knows expression. His conceptualization of what the words signify is culture-sensitive. One three year old city child was asked to classify animals into "good" and "bad" ones. He grouped pets and grizzly bears (presumably from his image of a teddy bear) together into the "good" category. A rural child grouped edible or otherwise useful farm animals, like cows and chickens into the "good" category. Birds were bad for him (they eat seeds and crops) while for the city child birds and mice were good (as they appear in charming children's books).

Anthropologists agree that enculturation begins at birth. As I shall try to demonstrate later in this paper, it begins even before, while the child is still in the womb. Concerning the gestural mode one can thus never talk of truly universal instinctual movements. In the evolution from verbal pre-language to verbal language my subjects showed the gradual emergence of adult language from stages of paralinguage. One cannot really call those forms iconic. If anything, they have a less complex degree of symbolicity than adult language because they do not yet operate with the duality of patterning. In the gestural mode, we can observe the same sequence from simple symbolicity to complex gesture clusters. The earliest expressive body movements may, however, be closer to iconicity, that is pantomime in their case, than are the earliest vocal expressions. Infants will stretch out their hands to manifest their desire to be picked up. In deaf children the development from pantomime to symbolic communication systems has been documented by Teervoort (1971) who has illustrated how a group of deaf children simplified and conventionalized pantomimes creating a symbolic communication system. Consistent developments of this type have been documented for American Sign Language by Klima and

Bellugi (1979). In the historical changes in sign language where pantomime and individual improvisation persist side by side with the use of symbolic structures, the transformation of an iconic form into a symbolic one did not automatically erase the earlier forms which may survive in parallel with the new symbols. In child language, some instinctual gestures are transformed into kinesic movements and some kinesic symbols are acquired ex novo from the existing environment given that children are enculturated into an established societal structure. In phylogeny, some new symbols may have been invented in addition to the transformed movement shapes. We must consider the possibility of transformation-plus-addition for both kinesic movement and verbal language in opposition to a theory of transformation from pre-existing forms only. The former theory seems intuitively more satisfying when one considers the increasing complexity of man's cultures. It must, nevertheless, remain speculative as we cannot indiscriminately equate ontogeny with phylogeny. Whether the emergence of verbal language and kinesic body movement happened at the same time in phylogeny, or whether a kinesic system arose before or after verbal language cannot be ascertained with assurance. In ontogeny, I strongly believe that the development is synchronous. The small child probably does not disassociate verbalizations and gestures that commonly have joint occurrence (von Raffler-Engel 1964: 68). Instinctively, "motherese" does appear to recognize this. Adults and older children, for example, rarely omit the hand waving motion when uttering the leave taking formula (von Raffler-Engel 1975). If there are instances where the child produces a gestural symbol before its verbal counterpart, this is not due to faulty perception but to possible difficulties in production. Cognitively, verbal and kinesic awareness follow the same

maturational curve. All available data clearly point in that direction, but caution is warranted because the amount of research in the field of developmental kinesics is still extremely scarce (French and Dorfman 1981).

The double bind situation has not been studied for infants. In school children, the age curve is not linear (Schöler and Züfle 1978). Phylogenetically, we do not know whether the double bind and the lie existed from the beginning, or represent two later developments. Small children do not suspect lying nor do they understand irony.

We find that our knowledge is even scantier when we go from the external history, from the forms by which human communication has been conveyed over time, to the internal history, the functions of the messages that were transmitted. Were all the functions present from the start or did they gradually increase in number? Are all, or some changes, changes in degree or in kind? In ontogeny, it appears that communicative functions are acquired gradually. Some functions exist from before birth while others emerge only during the third year of life (von Raffler-Engel 1964: 37). What pedolinguists call function corresponds, of course, to what semioticians term content. The only way the presence of a function in the child can be observed is through its expression. As said before, I go beyond considering this simply a research problem. To document my assertion, I would like to show that the first function to emerge is the emotive function. Researchers in child language are virtually unanimous on the primacy of the affective function.

Affect in the earliest stages involves only the regulatory category. It is no more than a reciprocal expression of togetherness and needs only rudimentary means of expression. Only later is the referential category added and then the first function proper is what I called the "desiderative"

(von Raffler-Engel 1964: 37) and what more recently was termed "instrumental" by Halliday (1975: 19-21), the child's desire for something, the fulfillment of a need. The very fact that the regulatory category appears before the referential category confirms the theory of language acquisition using the interaction model (von Raffler-Engel 1964: 19-20). So does the fact that the first function involving the referential category requires active response by the hearer.

It is usually assumed that from birth on the child gradually discovers himself. I, for one, believe that the child discovers himself as a separate being and begins to know about others as he interacts with his mother while he is still in the womb. The unborn child is even aware of the external environment. Pre-natal interaction obtains on the vocal and on the gestural level.

Starting in the early sixties, I surveyed pregnant women and established that the unborn child reacts to outside noises which are perceived as direct auditory stimuli and not necessarily mediated through an emotional transmission via the mother's reaction to the noise (von Raffler-Engel 1964: 75). A mother will talk softly to her unborn child if she feels he is disturbed by a threatening outside noise and this will indeed calm down nervous kicking by the unborn child. In the same vein, mothers will pet the part of their bodies where they believe the child is located.

The unborn's generic appeal becomes person-specific as soon as the child feels his mother's touch and wants to repeat the experience. The communicative role of the soothing voice and of the tender touch has the same purpose and effect. Mother-child interaction is verbal and nonverbal from the start. Recently, in the United States, the perceptive abilities of the fetus have begun to be explored. A survey article with a list of

extremely useful, albeit exclusively American, references has just appeared in the current May issue of Psychology Today (Spezzano 1981). Once it is accepted that the fetus reacts and interacts, it becomes indubitable that the newborn is capable of auditory and tactile communicative interactions. Recent discoveries that, in addition to movement and sound, the fetus is also sensitive to light (Spezzano 1981) can explain how eye contact is established very soon after birth. The vital impact of immediate post-natal contact between mother and child has been documented beyond doubt by Ringler and her associates (1976). Linguistic theories differ widely on when "language" begins. I, for one, am in agreement with Tonkova (1965) that the baby's cry is a forerunner of speech and cannot possibly see how one can consider the speech development of the child without reference to his earliest communicative attempts (von Raffler-Engel 1973). All other behavioral forms of the child evolve from less complex forms without radical breaks.

This paper proposes an orderly sequence of states in the development of communicative competence. The evolution from embryo to fetus is one of separation of mother and offspring. The boundaries of the offspring are clearly defined even though the boundaries of the mother are not so clearly definable as she contains her offspring until after delivery. The passage from embryo to fetus is of great consequence in the realm of communicative interaction. The mother becomes aware of the child's separate identity and his reactions to her responses to him. If the embryo has reactions but there is no reciprocal awareness, one can not yet speak of interaction.

At what stage can one speak of the regulatory and the referential categories as two discrete forms? As I see it, a second fundamental change occurs when the fetus becomes a newborn baby. During the neo-natal

period, three factors are of importance for the development of communication. When the umbilical cord is severed and the child's food supply becomes dependent upon his mother's will, rather than provided to him through an automatic process, the mother may withhold food and the child is compelled to cry and kick to demand food. Secondly, through the birth process, the child is now living in an environment that can be modified by others. His caretaker can cover him when he is cold and satisfy other felt needs. With the diversification of needs that can be satisfied by others, the referential category becomes distinct from the regulatory category. Thirdly, an important factor is the discovery of third parties. His principal caretaker is distinct from other people and the child recognizes his mother's voice and his mother's touch. Eventually he recognizes other people one by one, those that are likely to pick him up when he smiles, and those that will pick him up if he cries. Mother will bring him food and father will entertain him with play and talk. The infant learns a regulatory strategy for certain referential requests. Predication may obtain even before holophrasis. (For a discussion of predication in reference to holophrasis, see Pea 1981: 28).

The relationship of the mother with her unborn child is one of love, hatred, or indifference. By indifference is meant a dutiful but fairly mechanical care-giving which is not totally devoid of affection. All this is common knowledge, as are abortions and birth celebrations. That mothers and unborn children interact has been known for millenia but was not generally accepted by the scholarly community. During the past decade opinions have changed, and folk wisdom is no longer rejected as a matter of principle. Mothers have known all along not only that an interaction obtains but that the very first communication between herself and her offspring is emotive. This emotive function is expressed by the mother

in the form of high pitched tone, a regular vocal rhythm, and a rhythmic stroking motion of the hand with palm extended. This same form prevails while the child is a fetus and while he is a newborn. Maternal affective communication shows no drastic change immediately after birth. The continuity of sound and movement is probably vital for neo-natal adjustment, making for the one constant during the traumatic transition to life after birth.

The habituation of the child before birth to the same communicative behavior he will encounter after birth has implications that go beyond easing his adjustment and thus ensuring his survival. Through his continuous contact with his mother's body rhythm and her vocal rhythm, the child is enculturated into his society before he is born into it. The child is accustomed to the paralinguistic features of the language of his community and to the body movements characteristic of his group. After birth, the older people that have power over him will accept him as one of their own. This may be of strategic importance in primordial societies where the survival of the newborn is dependent on the decision of men.

Pre-natal enculturation is below the level of consciousness. Mothers perpetuate cultures without effort, or even awareness. A classic example is the preservation of African elements in the music and in the folk tales of Black Americans. Few, if any Black Americans are full-blooded Negroes, but miscegenation was generally through white fathers and not mothers. Thus, the rhythmic pattern of an African language and its corresponding kinesic system may be preserved even in individuals that from a racial standpoint are virtually Caucasian and that certainly speak English as their native language. The mother's words are English, but the intonation contour of her speech is not, nor is the hand motion by which she comforts the fetus.

Cultural differences are not transmitted by genes, but they are acquired before birth. How these differences came about to begin with is beyond our knowledge. The emotive function is present in the child's earliest pre-natal interactions and is universal. This observation could suggest insights into the phylogeny of human communication.

Body rhythm is the most vital and least conscious element of in-group identification. It is also the most disturbing factor in inter-cultural communication (von Raffler-Engel 1980b). Through the parallelism of verbal and nonverbal mother-child communication within the culture-specific rhythm of the mother, a human being's body rhythm is established before he is born.

The verbal/nonverbal parallelism is also a factor in making language acquisition easier for the child as the information is conveyed redundantly on two channels. Language lacking grammatical morphemes operates below the normal rate of redundancy. Children, and adults speaking to children, reconstitute a normal rate of redundancy through repetition (von Raffler-Engel 1970). The regular rhythm of the stroking motion of the mother caressing her fetus and the regular cadence of affective talk prepare the child for his syllable repetition in babbling and for the subsequent word and phrase repetition of toddlers' speech. If language is controlled by the left side of the brain and nonverbal behavior by the right side, the use of both at the earliest possible time stimulates the total brain and readies it for the electro-chemical activity that connects all parts of the brain during fully developed face-to-face interaction. The stimulation is important whether lateralization develops during the fetal period, as suggested by Kinsbourne (1967), or after the fourth month of life.

In conclusion, pre-natal interaction between mother and child facilitates neo-natal adjustment to the outside world, enculturates the child into his society, and prepares him for the acquisition of adult language. The interaction is verbal and nonverbal from the start. The system of human communication consists of the combination of these two modalities. Within a larger theoretical framework, this paper argues for a holistic approach to human behavior, without separation of body and mind (von Raffler-Engel 1981).

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